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OJCS COMPUTER
SYSTEMS 18 MONTH
IMPLEMENTATION PLAN
30 JUNE 1975

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ATTACHMENT 1

GC47 Computer
Center Plan

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1. Introduction

This paper provides further detail for the implementation of the OJCS Five Year Computer Systems Plan of January 1975. Provisions for both the GC-03 and GC-47 computer centers are considered. The period covered is 18 months, from the present through calendar year 1976.

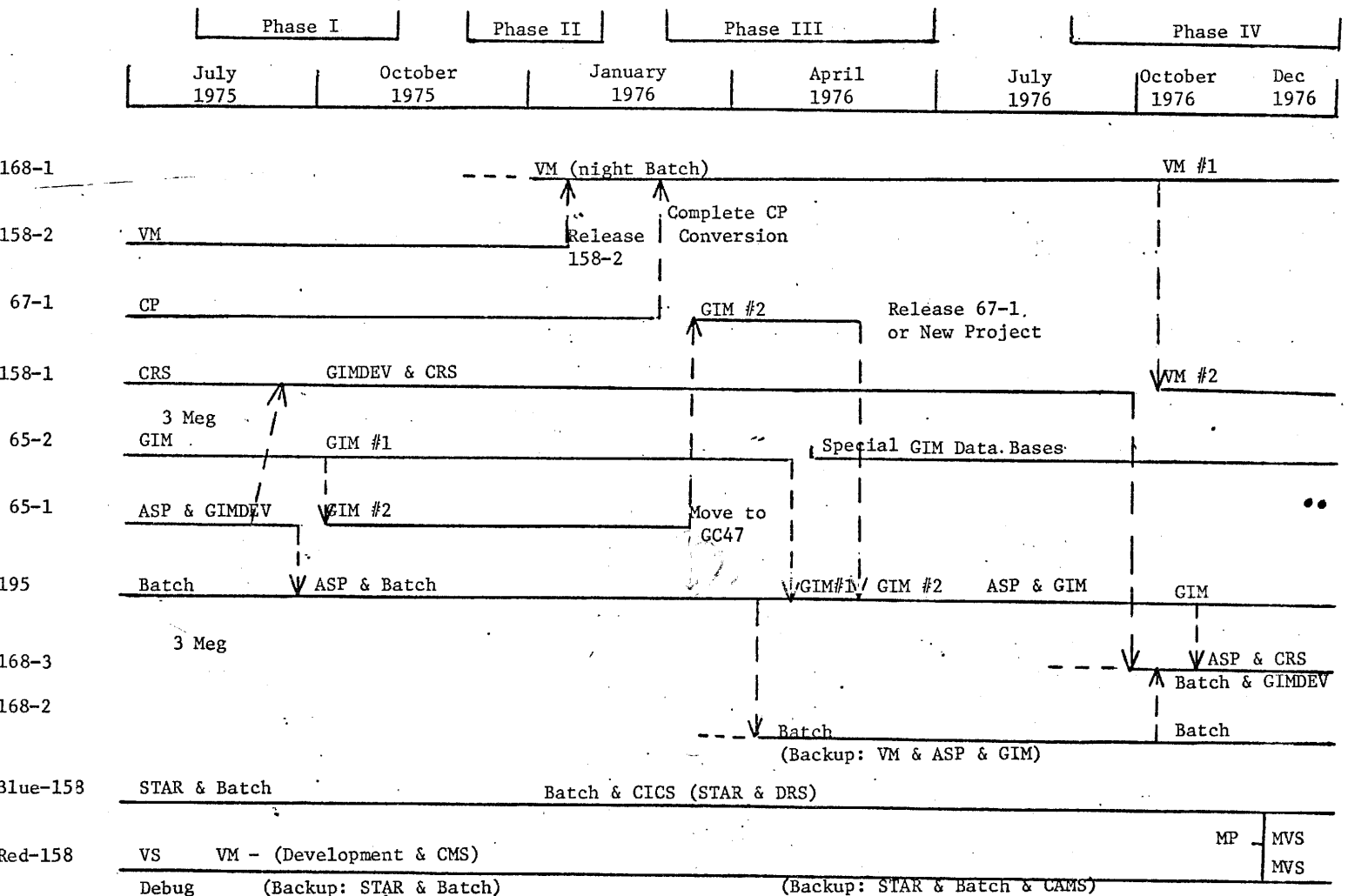
During the period three IBM 370/168s will be delivered to satisfy OJCS computer processing requirements. By the end of this planning period one of the 168s will be devoted to generalized time sharing applications under VM and the other two will be devoted to batch processing work. The 360/195 will be used to support GIMS production. CAMS support will be provided by moving the 360/65-1 to the GC-47 center to achieve a better distribution of the work load.

At the completion of phase III of this plan, scheduled for May of 1976, full backup for the GIMS and VM systems will be available.

Two additional papers are planned; the first will finalize all peripheral and communication requirements and will be published in August 1975, the second containing detailed specifications of peripheral configuration will be ready in October 1975.

Figure 1 is a Gant chart depicting new machine utilization and the migration of applications during the planning period.

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CAMS on Isolated Machine

The present plan provides significant improvements in backup capability. Figure 2 lists the backup options available in the plan's third phase (May 1976). The plan is also superior to previous plans in providing relief for our critical GIMS problems and in providing for a better workload distribution between the GC-03 and GC-47 Centers.

The plan as it pertains to the GC-03 center may be briefly summarized by citing the following milestones:

Phase I October 1975

Upgrade the 195 and 158-1 memories by one megabyte each. ASP support may now be moved to the 195 and the 158-1 can accommodate GIMS development. The 65-1, free of ASP support, can be used as a second GIMS production machine thereby doubling the GIMS production capacity.

Phase II January 1976

Install the 168-1 as the VM machine and release the 158-2.

Phase III May 1976

Install the 168-2 as an ASP main and consolidate the majority of the GIMS production work on the 195. By restricting the 168-2 to batch processing, it can serve as the backup to the 195 for GIMS and ASP work or the 168-1 for VM work. With all CP/67 users migrated to VM the 67-1 may be released or used for some special purpose.

Phase IV October 1976

Install the 168-3 to perform the ASP, GIM development and CRS functions. This frees the 158-1 for use as the second VM machine.

Backup Capability for GC-03 Computer Center
At End of Phase III (May 1976)

<u>System</u>	<u>Backup Capability</u>	<u>Impact on Other Work</u>
168-1 VM	Move VM to 168-2	Batch work during Prime Shift will be degraded. Second shift can use 195 and 168-2 to work off backlog.
195 GIM & ASP	Move GIM and ASP to 168-2	Batch work during Prime Shift will be degraded. Second shift can use 168-1 to work off backlog.
158-1 CRS and GIMDEV	Move work to 168-2 ASP Main and run concurrent with 168-2 batch work.	Batch will be reduced due to loss of core for batch jobs. Second shift can use 168-1 to work off backlog.
65-2 Work	May be moved to 168-2 or 195 GIM system.	Reduced Batch based on core used in 168-2.
168-2 Batch	No prime time backup. 168-2 Available second shift.	No impact on other systems.

FIGURE 2

The plans as it pertains to the GC47 Center may be characterized as follows:

Phase I August 1975

Install VM on the backup 158 (blue machine) for development and VM support for ISG programmers.

Phase II January 1976

Implement CICS on the red machine for teleprocessing support (STAR and DRS).

Phase III May 1976

Install the 65-1 for the CAMS application.

Phase IV December 1976

Install MP hardware and run the red and blue 158s as an MP system under MVS. At this point CMS support can be moved to the GC-03 Center or provided by TSO under MVS.

Figure 3 presents a diagram of the step by step GC-47 Center implementation.

The final section of this paper presents the plan in greater detail, citing advantages and problems associated with each phase of the implementation.

GC-47 Computer Center Plan

Current Center:

RED-158
STAR
Batch
VS

BLUE-158
Development
NIPS
VS

Phase I
August 1975

RED-158
VS
-STAR
-BATCH

BLUE-158
VM & RED backup
-Development
-NIPS (MVS & CICS)
-CMS

Phase II
January 1976

RED-158
VS - Batch
CICS: STAR
DRS NIPS

BLUE-158
VM & RED backup
-Development (MVS) *Source VS*
-CMS

Phase III
May 1976

RED-158
VS - Batch
CICS: STAR
DRS NIPS

BLUE-158
VM & RED backup
CAMS backup
-Dev. (MVS)
-CMS

65-1
CAMS

Phase IV
December 1976

RED

MP
158

BLUE

CAMS Backup
Run as UP
158's

MVS - Batch CMS Support:
CICS: STAR GC03 VM or TSO
DRS
NIPS

65-1
CAMS

FIGURE 3 - GC-47 Computer Center Plan

2. BACKGROUND

2.1 Objectives

The implementation of the plan described in this paper will satisfy the requirements of OJCS's computer users with significant response time improvement and provide 100% backup capability to the generalized time sharing and GIMS online community. With two 168s devoted to batch processing work, failure of a single CPU will have minimal effect on batch throughput over a 24 hour period. This plan will establish a basic configuration that can be upgraded to provide 95% terminal availability.

The detailed objectives of this plan take the form of solutions for the following requirements:

- a. Provision for 100% backup for online users of GIMS and VM (generalized time sharing).
- b. Hardware and software facilities to satisfy the requirements of the new OJCS applications; ORACLE, Interim SAFE, DRS in the GC-47 Center and CAMS on a dedicated machine with backup.
- c. Expand GIMS production capabilities to handle an increased load of up to 10,000 online transactions per day by January 1977. The current level is 4,000 transactions per day.
- d. Expand time sharing capabilities to handle up to 200 concurrent users during peak load periods by January 1977. Present facilities handle up to 95 concurrent users.
- e. Provision for a batch workload of 130 equivalent 360/65 CPU hours per day. This translates into approximately 1,680 jobs per day. The current level is 95 equivalent CPU hours or 1,320 jobs per day.
- f. Provision for terminal and Comten support for up to 600 terminals. 350 terminals are currently supported.
- g. Expand GIMS development capabilities by at least 100% by the end of 1975.

2.2 Problems

Current OJCS computing facilities are reaching the saturation level; time sharing response on the CP/67 is often inadequate and batch processing facilities are periodically overloaded. The GIMS online production and development facilities are in particularly critical condition with poor response affecting both ongoing and development projects.

The nature of the service provided by OJCS is in a state of transition with increasingly large amounts of work being done online rather than in the batch mode. This mode of operation exposes OJCS to higher visability when equipment fails. For this reason greater reliability and back-up are required to satisfy the user community.

The present GC-03 configuration has significant drawbacks in backup capability. The majority of generalized time sharing users are on the 67-1 system for which we have no backup. The GIMS production system running on the 65-2 is effectively not backed up either. GIMS can be moved to the 195 but this requires a number of communication patch panel changes and impacts our batch throughput capability.

The installation of new equipment (four 370/168s) over the next two years will provide OJCS with the computing capacity needed to improve service to its' users, meet projected demands and satisfy new applications. The implementation plan to fulfill these requirements however, is constrained by a number of factors.

The major constraining factors are:

- a. The limited space available in the GC-03 Center until an additional 3000 square feet becomes available in July 1976.
- b. The hardware, software and manpower resources required for the installation and testing of the ORACLE system.
- c. The complexity of terminal and peripheral switching facilities needed to meet backup requirements.
- d. The need to provide better response for the GIMS community and backup for all online users as soon as possible.
- e. The requirement to free up a dedicated computer and peripherals for CAMS by April 1976 for a July 1976 production date.

2.3 Assumptions

A number of basic assumptions were made in developing this 18 month implementation plan. Fundamental to the plan's design are the assumptions that the 195, with an added megabyte of memory, can operate the ASP support system to satisfy OJCS batch requirements and that the 65-1 can be moved to the GC-47 Center to provide needed space in the GC-03 Center.

In addition the following assumptions are critical to the plan's implementation:

- a. The GC-47 Center can provide hardware backup for the CAMS machine (65-1).
- b. An early release of the 158-2 will provide enough money for the early delivery of the 168-2 and memory expansion of the 195.
- c. CP/67 users can be migrated to VM on the 168-1 by March 1976.
- d. The 168-1 can handle the VM load until the delivery of the 168-3 in October 1976 frees up the 158-1 for VM work.
- e. The MTBF (mean time between failure) and MTTR (mean time to repair) characteristics of the older 360 equipment (195, 65-1, 65-2 and 67-1) will be adequate for online applications.
- f. Space can be made available to place the first two 168s in the GC-03 Center before the additional 3000 square feet becomes available.
- g. Logistical support can be made available to meet our tight schedule requirements.
- h. Sufficient OJCS manpower will be available for this implementation.
- i. Required peripherals and terminal controllers can be obtained with short lead times for orders.

2.4 Alternatives

During the development of the 18 month plan, many alternatives were considered for staging the machines to arrive at the final configuration of four 168's and the 195 called for in the OJCS Five Year Plan. The current plan was chosen because it offered:

- a. The best balance of resources to requirements
- b. Allowed for the installation of 168-2 without requiring the additional 3000 square feet of space to be available.
- c. Provides for an increase in resources allocated to GIMS during the earlier phases of the plan.
- d. Provides full backup for VM and GIM at the end of phase III (May 1976) compared to degraded back-up provided by the original plan.

Figures 4 and 5 compare the revised plan with the original plan at each phase. The points to be emphasized in comparing the two plans at each phase of their development are as follows:

Phase I

The revised plan expands GIMS production and development where the original plan only expanded the GIMS production system.

Phase II

Due to the number of applications scheduled for the 168-1 in the original plan, it would have required 5 megabytes of memory while in the revised plan the size of the 168's is kept to 4 megabytes. The revised plan moves all CP and VM users to a single machine sooner than the original plan, a setp which must precede any backup capability for these users. A rental saving will also be realized in the revised plan by releasing the 158-2 earlier and applying the money to the purchase of the 168-2.

Phase III

By the end of this phase the revised plan is using the 168-2 as a dedicated batch machine. The advantage is that it can be used as backup for VM on the 167-1 or GIM and ASP support on the 195 without interrupting any other terminal applications. GIMS production is assigned to the 195 sooner in the revised plan which provides additional power to GIMS earlier.

Phase IV

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At the end of this phase, the plan is to be essentially the same with the exception of the revised plan's placement of the CAMS machine in the GC47 computer center. Were the CAMS machine kept in the GC03 center, backup for it would have to come at the expense of another terminal machine such as VM or one of the GIM machines since use of the 168-2 for backup would not be economical.

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Comparison with January 1975 Five Year Plan

July 1975

195 Batch	158-1 CRS	158-2 VM
65-2 GIM	65-1 ASP GIMDEV	67-1 CP67

Original Plan

195 Batch <u>3 MEG</u>	158-1 CRS <u>GIM #2</u> <u>3 MEG</u>	158-2 VM
65-2 GIM #1	65-1 ASP GIMDEV	67-1 CP

Revised Plan

195 Batch ASP <u>3 MEG</u>	158-1 CRS <u>GIMDEV</u> <u>3 MEG</u>	158-2 VM
65-2 <u>GIM #1</u>	65-1 <u>GIM #2</u>	67-1 CP

October 1975
Phase I

Original Plan

195 Batch	158-1 CRS GIM #2	158-2 VM
65-2 GIM #1	168-1 ASP GIMDEV <u>Batch</u> <u>CRS 5 MEG</u>	67-1 CP
	65-1 Free for CAMS	

Revised Plan

195 BATCH ASP	158-1 CRS GIMDEV	168-1 <u>VM</u>
65-2 GIM #1	65-1 GIM #2	67-1 CP
	158-2 Release	

January 1976
Phase II

Original Plan

195 Batch	158-1 GIM #2	158-2 VM
65-2 GIM #1	168-1 ASP GIMDEV <u>Batch</u> <u>CRS</u>	67-1 CP
	65-1 CAMS	

Revised Plan

195 BATCH ASP	158-1 CRS GIMDEV	168-1 VM
65-2 GIM #1	168-2 <u>Install</u> & <u>Test</u>	65-1 <u>GIM #2</u>
	67-1 Idle New Proj.	

March 1976
Phase III-A

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18 Month Implementation Plan

Comparison with January 1975 Five Year Plan

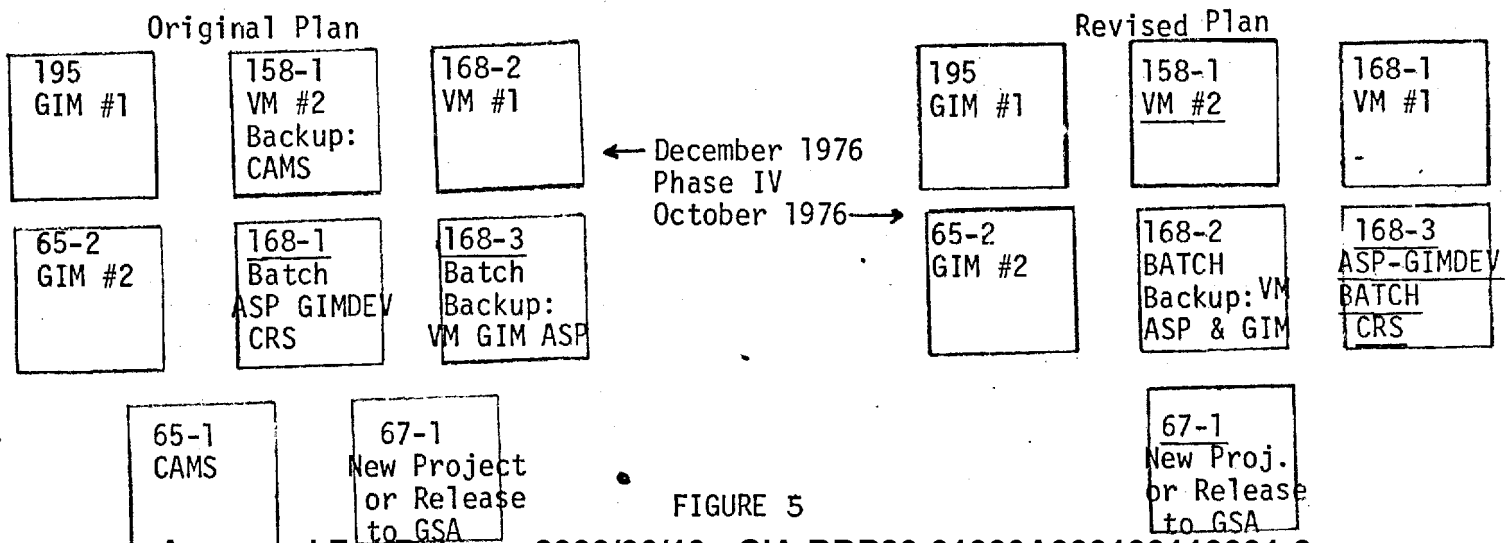
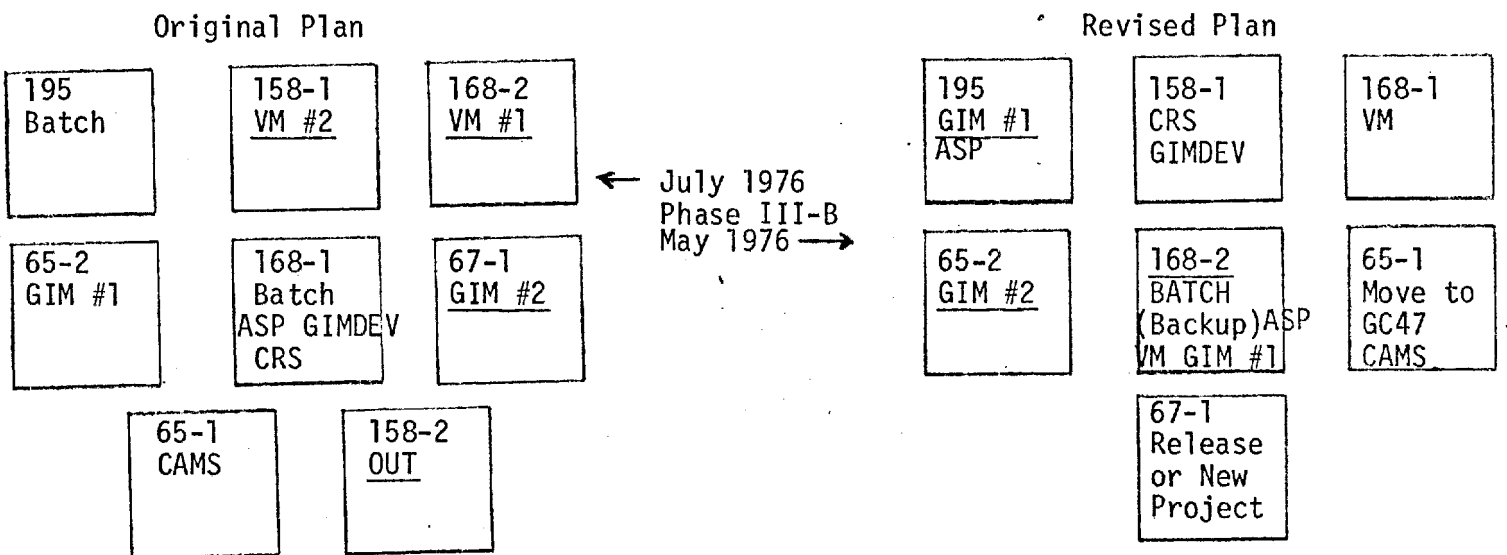
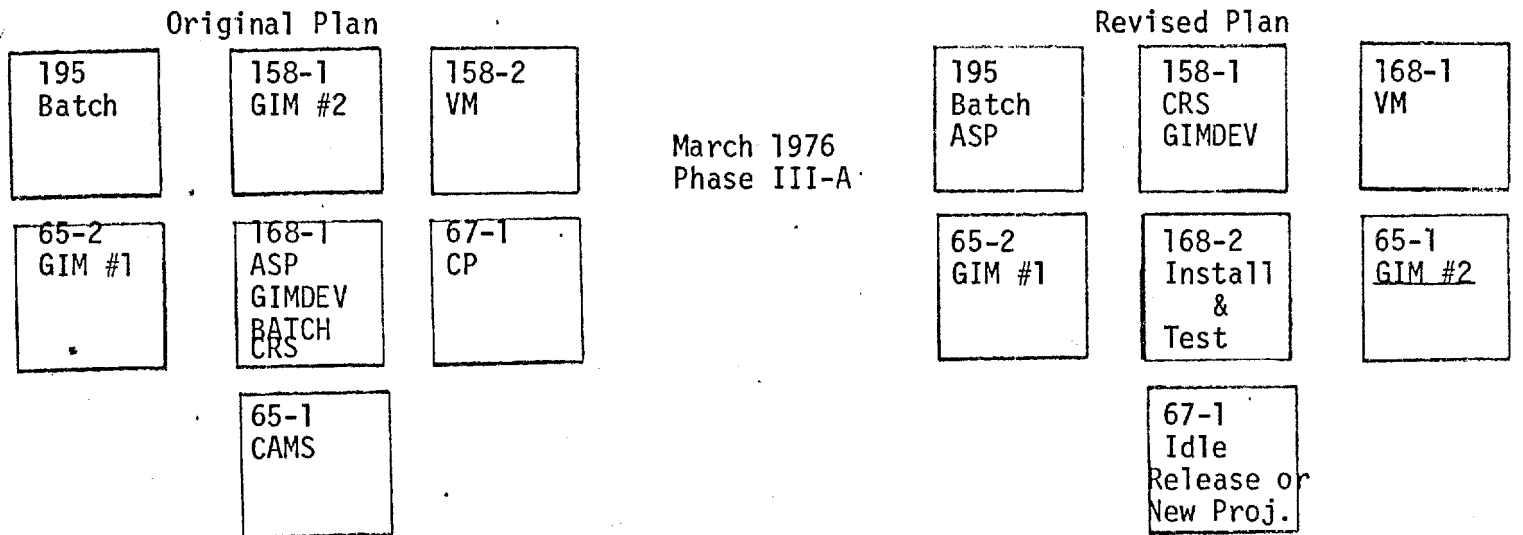


FIGURE 5

3. DETAILED PLAN

With the exception of the move of the CAMS machine (65-1) to the GC-47 Center, with the blue 158 to serve as backup, this plan as it pertains to the GC-47 Center is the same as the GC-47 Computer Center Plan described in Attachment one.

The detailed recommendations for this plan's implementation as they pertain to the GC-03 Center are divided into four phases. Figures 6 through 9 illustrate the beginning and ending configuration of each phase and list major tasks and critical items for the separate phases.

The plan's four phases with their associated advantages and problems are as follows:

Phase I

Memory upgrades for the 195 and 158-1 October 75 processors (see Figure 6).

Advantages

- ° Improved GIMS processing capability. By moving ASP support to the 195 the 65-1 is freed to support the second GIMS production application, thereby doubling the number of equivalent GIMS transactions we can process.
- ° Adding memory to the 158-1 will provide room for Interim SAFE and allow us to utilize the spare CPU power of this machine. GIMS development running here will provide better response. The extra memory available will allow GIMS development to support four concurrent transactions instead of the present two.
- ° The termination of the BR90 project will allow us to move the 2250 support program to the 65-2.

Problems

- ° If the 195 goes down for a prolonged period during the day GIMS production II will have to come down to provide ASP support on the 65-1.

- Communications support will be more complicated than in prior plans. All BSC lines to the 195 will have to go through a Memorex controller or the Comten I.
- Upgrading the 195 memory may cause a period of unstable performance for this machine.

Phase II

Installation of the 168-1 and release of the 158-1 (see Figure 7.)

Advantages

- VM processing capability will be significantly increased allowing for a faster migration of CP/67 users.
- The added power of the 168 can be used for some of the batch load at night.
- Rental savings from the 158-2's early release can be used to offset 195 upgrade costs and earlier installation of the 168-2.

Problems

- The 168 will be running on unbuffered power until March.

Phase III

Install the 168-2 as an ASP main and backup machine. at this point analysis of GIMS performance on the 195 may dictate the advisability of a fourth megabyte of memory for this machine (see Figure 8).

Advantages

- When the 168-2 is fully operational we will have 100% backup for VM, GIMS and CRS at the expense of a degraded batch service.
- Under normal conditions batch processing capabilities will be significantly increased.
- The 67-1 can be released or retained for special purpose processing. The 67-1's peripherals can be used for CAMS.

- ORACLE testing can be performed on the 158-1 or 168-2 at night.
- Flexibility in implementing future phases now exists since we have sufficient computing power to meet most projected demands.

Problems

- The 65-1 must be moved to the GC-47 Center.
- CP/67 users must have migrated to VM prior to the release or reutilization of the 67-1.
- A great deal of Logistics and Operations support will be required to implement the various steps of this phase.
- Two alternatives must be evaluated for implementing this phase; ASP support can be moved to the 65-2 or 158-1 with GIMS production I and II run on the 195 or GIMS production II can be run on the 67-1. In either case the 65-1 can be released for the CAMS project.

Phase IV

Install the 168-3 and move the 158-1 functions to this machine. The 158-1 can now be used as the second VM machine. The ASP function is also moved to the 168-3 (see Figure 9).

Advantages

- The generalized time sharing capability (VM) will now be sufficient to meet projected requirements till June 1977.
- Batch throughput capability is expanded to meet projected demands.
- The MVS operating system may be implemented to take advantage of its' security features.

Problems

- No significant problems are involved with this phase since space should be available at this time. The schedule of this phase will not be critical unless time sharing demand increases the need for the 158-1 or ORACLE testing requirements increase.

Phase I - GC03 Computer Center
September to October 1975

Begin Phase I			End of Phase I		
195 Batch 2 Meg	158-1 CRS 2 Meg	158-2 VM 3 Meg	195 Batch ASP *3 Meg	158-1 CRS GIMDEV *3 Meg	158-2 VM 3 Meg
65-2 GIM 2.5 Meg	65-1 ASP GIMDEV 1.5 Meg	67-1 CP 1 Meg	65-2 GIM #1 2.5 Meg	65-1 GIM #2 1.5 Meg	67-1 CP 1 Meg

Major Tasks to Complete Phase I

1. Add 1 Meg of memory to 158-1 (3 Meg).
2. Add 1 Meg of memory to 195 (3 Meg).
3. Reconfigure disks and terminal controllers to move:
 - a. GIMDEV from 65-1 to 158-1
 - b. 40% GIM from 65-2 to 65-1
 - c. ASP support from 65-1 to 195
4. Move GIMDEV from 65-1 to 158-1 with CRS work.
5. Expand CRS work for interim SAFE requirements.
6. Move ASP support to 195 with batch work.
7. Move 40% of GIM work from 65-2 to 65-1.
8. Complete site preparation for 168-1.

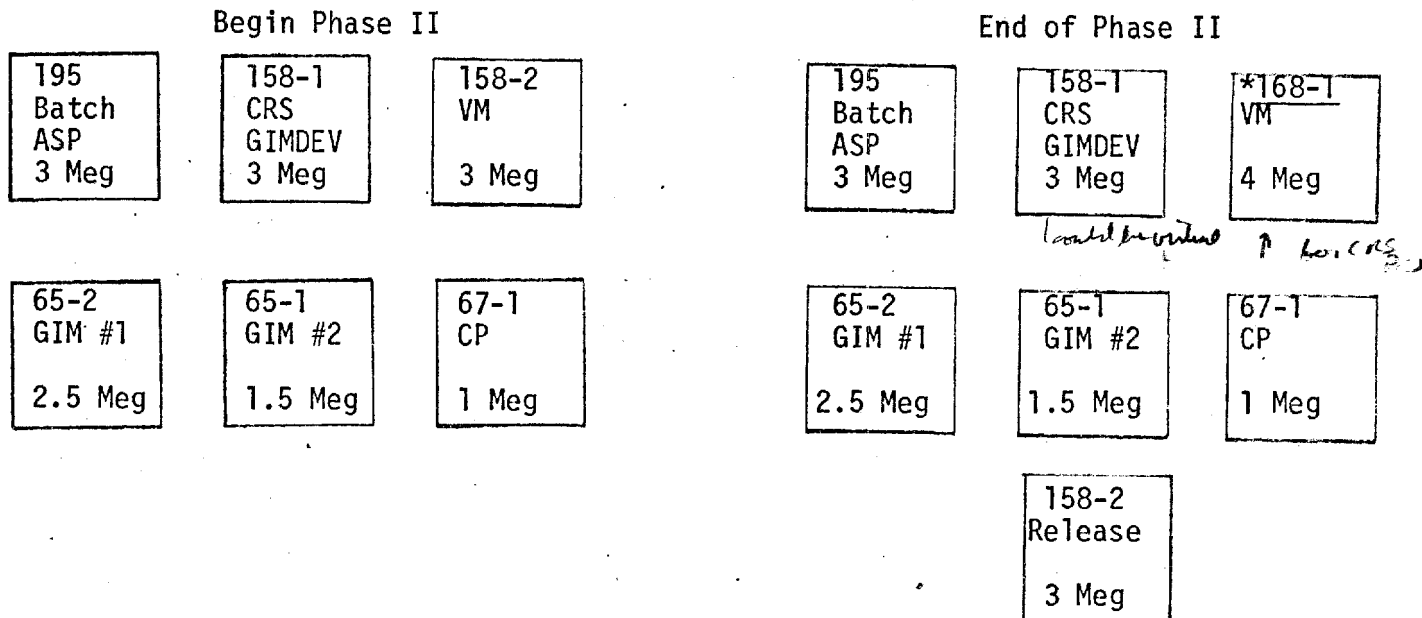
(4) moves

Critical Items

1. Order and installation of 195 must be done in short time to improve GIM production system.
2. Terminal controller changes must be done in a short time period.

FIGURE 6. Summary of Phase I Task

Phase II - GC03 Computer Center
December 1975 to January 1976



Major Tasks to Complete Phase II

1. Install switches for peripherals so that:
 - a. 168-1 can support VM or Batch and CRS
 - b. 158-1 can support Batch and CRS or VM.
2. Install 168-1 and test as an ASP main.
3. Move VM work from 158-2 to 168-1.
4. Release 158-2.
5. Begin final migration of CP users from 67-1 to VM on 168-1. (*move*)

Critical Items

1. Slippage of this phase would delay move of 65-1 to GC47 for CAMS support, that is required to make room for 168-2 which must be installed by 30 June 1976.

(2)

FIGURE 7 - Summary of Phase II Task

Phase III - GC03 Computer Center
March to May 1976

Begin Phase III

195 Batch ASP 3 Meg	158-1 CRS GIMDEV 3 Meg	168-1 VM 4 Meg
65-2 GIM #1 2.5 Meg	65-1 GIM #2 1.5 Meg	67-1 Idle 1 Meg

End of Phase III

195 ASP GIM #1&2 3 Meg	158-1 CRS GIMDEV 3 Meg	168-1 VM 4 Meg
65-2 R-GIM RESTRICTED 2.5 Meg	*168-2 Batch Backup- 4 Meg	VM GIM & GIMDEV ASP CRS
67-1 Released or New Project 1 Meg	65-1 Moved To GC47 for CAMS 1.5 Meg	

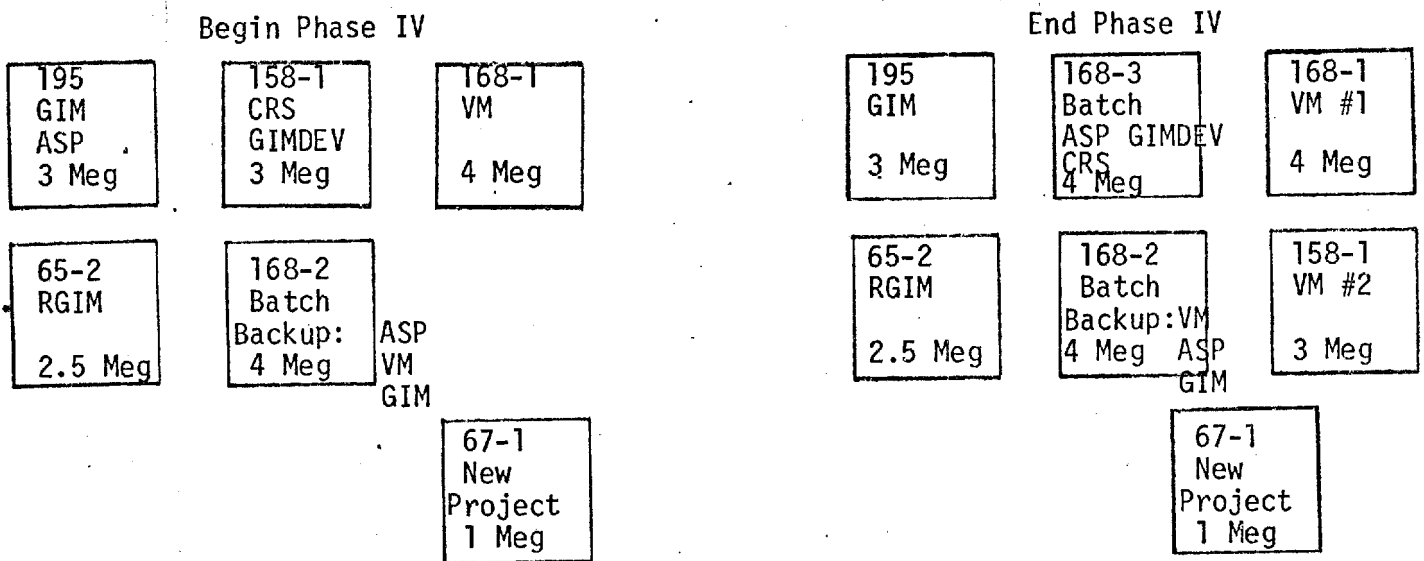
Major Tasks to Complete Phase III

1. Complete Migration of CP users from 67-1 to 168-1 so 67-1 is idle.
2. Complete installation of switches to provide required backup.
3. Move GIM #2 users from 65-1 to 67-1. (Switch peripherals)
4. Move 65-1 and CAMS peripherals out of GC-03 to GC-47 computer center to make room for 168-2 in GC-03.
5. Install and test 168-2 as ASP main.
6. Move 90% of batch jobs from 195 to 168-2.
7. Move GIM #1 data bases from 65-2 to 195.
8. Move GIM #2 data bases from 67-1 to 195.
9. Establish special GIM system on 65-2 for sensitive data bases.
10. Establish backup procedures to move:
 - a. VM to 168-2 if 168-1 fails.
 - b. GIM and ASP to 168-2 if 195 fails.
 - c. CRS and GIMDEV to 168-2 if 158-1 fails.

Critical Items

1. 65-1 must be moved out before 168-2 can be installed.

Phase IV - GC-03 Computer Center
October to November 1976



Major Tasks To Complete Phase IV

1. Complete site preparation for 168-3 in new 3000 square feet on first floor.
2. Install and test 168-3 as an ASP main.
3. Move CRS and GIMDEV to 168-3 to free up 158-1 as a second VM system.
4. Establish second VM system for work load that cannot be handled on 168-1.
5. Move ASP to 168-3 to provide added capacity to GIM on 195.

Critical Items

1. VM work load may be at saturation point on 168-1 which would be the driving force to complete this phase.
2. Additional space must be available.

FIGURE 9 - Summary of Phase IV Tasks

ATTACHMENT ONE

GC47 COMPUTER

CENTER PLAN

PAGE 1

30 June 1975

SUBJECT: GC47 Computer Center Plan

Introduction

The GC47 computer center is currently using two 370/158's (referred to as the red and blue machines), running under the VS2/R1.7 operating system, to provide online and batch facilities. The red machine provides online services using a locally modified monitor/supervisor (TPMON/TPSUP) to support STAR and OAS, TCAM to support DCS and an internal executive for ATS. Production and development batch jobs are also run on this system.

The blue machine is used to support NIPS online applications which are also run under TPMON/TPSUP, and GC47 and SED development projects. This machine also provides backup capability for the red machine's online requirements.

This document presents a plan to satisfy the requirements for new and expanded ISG online facilities over the next eighteen months. The major goals of the plan are: (1) the introduction of a general purpose teleprocessing monitor/supervisor capable of eventually meeting all of the GC47 center's needs, and (2) the implementation of the software tools required to develop new GC47 application systems. An outline of topics to be addressed beyond the eighteen month time frame, such as the possibility of implementing a multiprocessor configuration, is presented under the heading "Future Directions".

New GC47 Requirements

Document Reference System (DRS)

This system will provide the information needed to locate and retrieve documents which have been identified from a STAR index search or other source. Although DRS is not technically a part of the STAR system it will run concurrently as part of the STAR complex of on-line systems (OAS, DES, Name Trace and Name Group).

Phase I of DRS is scheduled to be operational in January of 1976. It will replace DCS and the two strings of 2314 disks (6 spindles per string) dedicated to DCS can be released at this time. Phases II and III of DRS will be implemented in the first and second halves of 1976 respectively and will require new cards reading, interpretive punching and line printing terminal equipment to replace existing 2740/1051 equipment.

PAGE 2

TPMON/TPSUP Replacement

The expanding requirements of the GC47 online applications, in particular DES and additional Name Trace terminal interfaces, plus the added requirements of DRS will exceed the ability of TPMON/TPSUP to process them adequately. This monitor/supervisor is also deficient in that it does not operate as well as some subsequently developed teleprocessing executives in a virtual system environment.

To provide the facilities needed to fulfill the Center's expanding requirements, the IBM general purpose teleprocessing monitor/supervisor, CICS, will be implemented as the executive for the DRS application and will eventually replace TPMON/TPSUP entirely.

Programmer Support

The implementation of DRS, other ISG programming projects and the CICS executive will require computing facilities for the ISG programmers involved in development and the SED systems programmers who have to install and test CICS and other required software modules. The Virtual Machine Operating System (VM/370) will support both of these activities while continuing to support the current work load on the blue machine.

VM/CMS will be available to provide support for regular ISG development programming as it does currently for OJCS programming. A new terminal room to house a remote reader/printer and 15 terminals is planned for this purpose and should be operational by November of 1975.

Implementation

CICS, the IBM general purpose teleprocessing executive, has been chosen to serve as the monitor/supervisor for DRS and to eventually replace TPMON/TPSUP for all GC47 teleprocessing applications. It is a transaction oriented system capable of handling a large number of terminals and of processing a high transaction volume. In addition CICS interfaces with most of the newest terminal devices available and will run under IBM's virtual operating systems.

VSAM, IBM's virtual storage data access method is required for the expanded functions of the CICS executive and is an integral element in the full DRS design. As with CICS, VSAM training and implementation schedules must be established to interface with the development schedule of the DRS project.

PAGE 3

The development and testing of the various software components in the total GC47 plan (DRS, CICS, VSAM) must be performed on the GC57 hardware while the production level of the current STAR system and other ISG applications is maintained. To provide the software tools to accomplish these tasks the IBM VM/370 operating system will be installed on the blue machine.

The VM system will allow multiple virtual machines, with different operating systems, to run concurrently on the same hardware. In this way, various operating system components can be tested at the same time on different virtual machines. VM also provides the user with the Conversational Monitor System (CMS). CMS will provide time sharing facilities for the GC47 development programmers similar to those used by OJCS programmers. This system contains all the facilities required to support a structured programming development project.

Some response time degradation should be expected from the NIPS system on the blue machine because of the VM/370 installation. NIPS will be moved to the red machine and operated under a TPMON simulator by October of 1975.

The major milestones in this implementation plan are:

DRS - Begin coding in April 1975
User testing in October 1975
Phase I production in January 1976

CICS - Initial system in May 1975
Generate production version in August 1975
Production in January 1976

VSAM - Test in virtual machine environment in July 1975
Production in October 1975

VM - Install in August 1975
Expand for application programmer terminals in November 1975.

Hardware - Terminal controller, 15 terminals and reader/printer in November 1975.
Additional online storage by November 1975.

Attachment A contains block diagram schematics depicting the red and blue machines' software system configurations during the development cycle.

PAGE 4

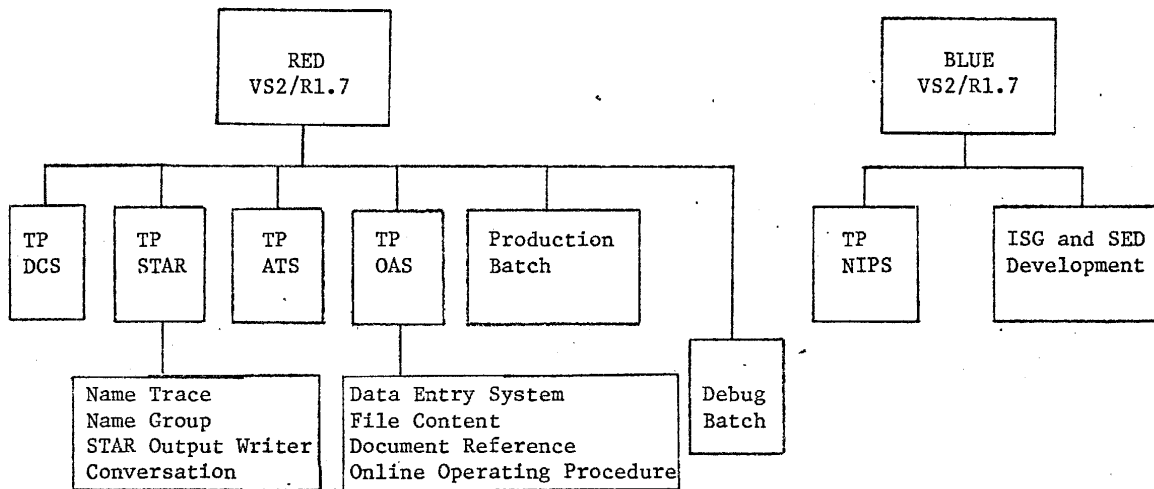
FUTURE DIRECTIONS

By March of 1976 SED and ISG will jointly develop a five year plan for ISG computer system support. Among the points to be addressed are:

- The definition of long range work requirements.
- The definition of long range hardware requirements.
- An evaluation of ATS, SCRIPT and ATMS and the selection of one for ISG use.
- The selection of a replacement for the NIPS system.
- An evaluation of the MP/MVS system as a successor to VS2/R1.7.
- An evaluation of support for an increased number of local and remote terminals for STAR, including the possibility of a front end processor.
- The evaluation and choice of either TSO or CMS to provide time sharing facilities for the GC47 center.

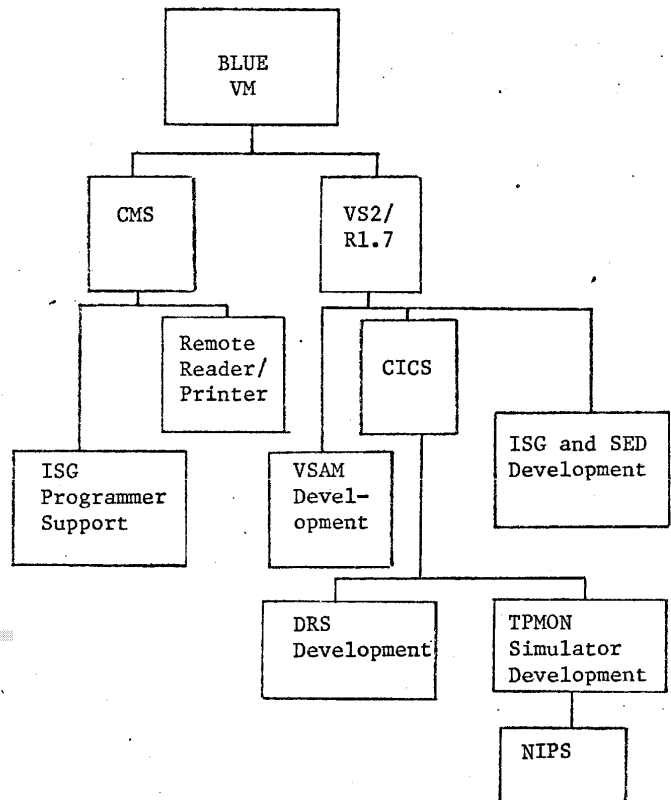
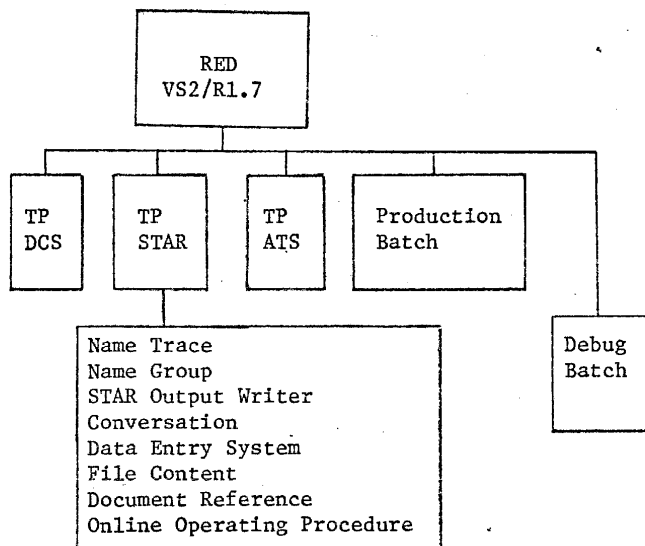
APPLICATION CONFIGURATION ISPB (GC47)

CURRENT SYSTEM



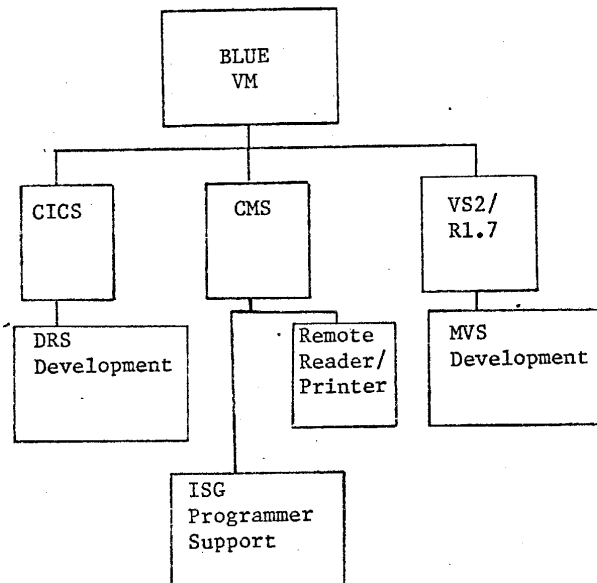
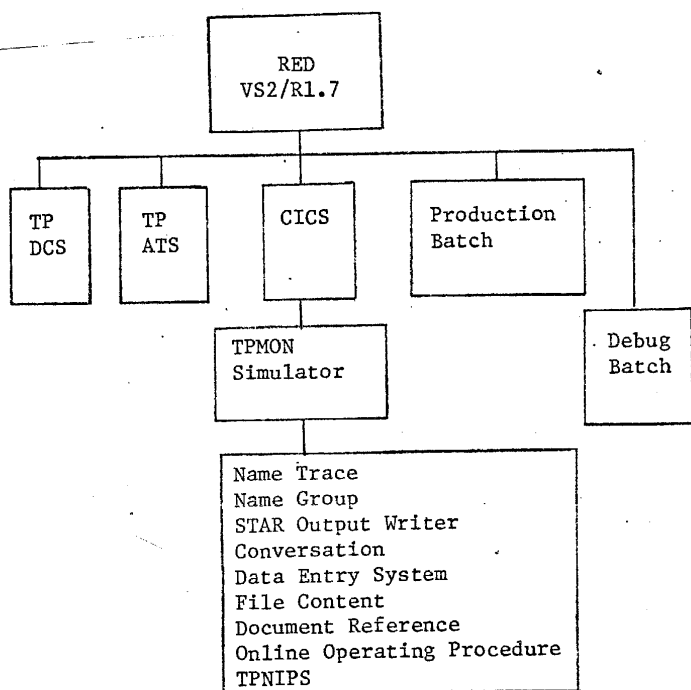
APPLICATION CONFIGURATION ISPB (GC47)

AUGUST 1975



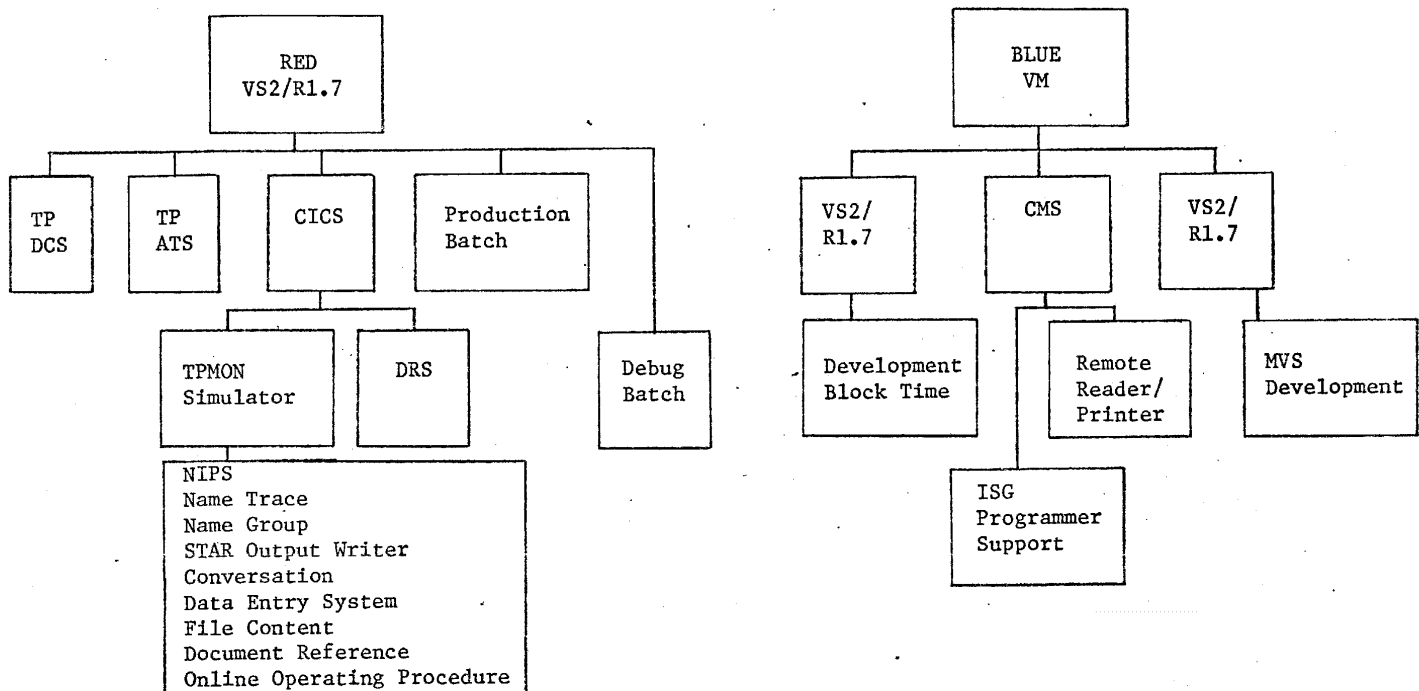
APPLICATION CONFIGURATION ISPB (GC47)

OCTOBER 1975



APPLICATION CONFIGURATION ISPB (GC47)

JANUARY 1976



APPLICATION CONFIGURATION ISPB (GC47)

MVS SYSTEM (Tentative) DECEMBER 1976

